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ABSTRACT

Designed for use with industrial cooperative training programs, this study guide on floor covering installation presents the basic foundation knowledge which must be put to practice on the job. The guide begins with a floor covering occupational brief. Specific topics in this section include status of the occupation, working conditions, salary, and future employment. The remainder of the guide is comprised of the following ten units of instruction: (1) Methods of Fitting Sheet Materials: Freehand Knifing; (2) Scribing, Direct or Straight, Scribing Pipe, and Door Trams; (3) Pattern Scribing; (4) Recess Scribe of Underscribe Seam, Finishing the Job, Installation Tips; (5) Installation Tips on Pattern Matching Sheet Vinyl Floors; (6) Estimating Patterned Sheet Materials; (7) Installation Procedures; (8) How to Test for Moisture Underlayments; (9) Adhesive Recommendations for Installing Resilient Floors; and (10) Adhesives. Each unit follows a typical format: materials needed, references, introduction; assignment, and check-up questions. An instructor's key for the study guide is appended. (LRA)

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V&TECC CURRICULUM GUIDE

Vocational and Technical Education Curriculum Center

STUDY GUIDE FOR FLOORCOVERING

CE 024 153

Division of Vocational and Technical Education
College of Education
Virginia Polytechnic Institute and State University
Blacksburg, Virginia 24061

and

Division of Vocational and Adult Education
Virginia Department of Education
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FOREWORD

This is one in a series of directly related study guides for use with Industrial Cooperative Training programs. In the I.C.T. program both generally related and directly related materials are taught in the in-school phase of the program. This study guide on Floor Covering Installation presents the basic foundation knowledge which must be put to practice on the job.

Thanks are expressed to all the instructors listed on the following page and to Lester G. Duenk and Robert P. Braden who coordinated the development of this study guide.

Ben L. Baines
State Supervisor
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September 1979

PREFACE

Often the coordinator of Industrial Cooperative Training is faced with the need for developing a study guide which is not available from normal industrial sources. The need for such a guide is encountered whenever the coordinator places a student in a training situation without direction given through text or related material.

This edition of Study Guide For Floorcovering is a revision of a 1968 study guide which was designed for use with the Armstrong Cork Company Installation Manual. This manual was recently revised resulting in the need for a new student study guide. This revised Study Guide for Floorlaying was developed by several ICT coordinators in a workshop held at Virginia Polytechnic Institute & State University.

This guide should not be regarded as complete and final. It may be necessary to modify details to meet local conditions, or to keep pace with developments in the floor covering industry.

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FLOOR COVERING OCCUPATIONAL BRIEF

STATUS OF THE OCCUPATION

A flooring mechanic is a person who performs the art of installing resilient floors, walls and counter tops.

Installing floors is truly an art and a skilled craft, and the flooring mechanic is considered a professional skilled craftsperson. The flooring mechanic possesses the skill, craftmanship and knowledge of working with floor covering materials.

WORKING CONDITIONS

The flooring mechanic has very good working conditions and hours, and is among the higher paid skilled workers in the United States. Floorcovering is clean indoor work where the flooring mechanic often finds air-conditioned buildings in the summer and heated buildings in the winter. Because it is installed indoors, and the sale of floorcovering is steady, the flooring mechanic will find the work steady and unaffected by the seasons of the year.

The flooring mechanic usually works a regular day shift. In certain situations, however, such as floorlaying in a department store or a private home where both members of the family work, it may be necessary on occasions to work evenings or on weekends or holidays. There is also the opportunity to install floorcoverings on the weekend for added income. This is not only a very profitable situation, but it is very satisfying to install an attractive floor for a friend or neighbor.

Pride in work and personal satisfaction are just two of the many benefits in floorcovering. Other benefits as a flooring mechanic are: (1) One can get a good start with only a moderate investment; (2) Most of the supplies are furnished by the employer; (3) Floorcovering is a safe occupation with very little chance of injury; (4) A brief training period gives life-time opportunities; (5) There is a possibility of going into business for yourself, and (6) Your services are very valuable to your employer.

SALARY

As a flooring mechanic, very good salaries are available. In 1978 a survey of a limited number of firms showed that flooring mechanics were earning from $5.50 to $10.15 per hour with starting salaries for apprentices and other trainees about three-fourths of the salary for mechanics. This wage scale, of course, varies with the area of the country and the degree of skill and specialization of the individual. Most floorcovering work is done by contract, with varying prices.

Generally, there are five different ways in which a flooring mechanic is paid: (1) hourly pay; (2) salary; (3) salary-plus-bonus; (4) salary-plus-commission on sales; and (5) piece work. The salary-plus-bonus system is based on the store's profits or sales volume for the year. The system of salary-plus-commission on sales can be very profitable when you make sales while on the job.

QUALIFICATIONS

To become a skilled flooring mechanic, you must develop much skill in the use of flooring tools, the matching of colors and the use of color schemes. There are several ways to gain these skills. Some of the ways are as follow: (1) Vocational School Training; (2) Factory Training Schools; (3) Traveling Installation Schools; (4) Union

Training Schools; (5) On-the-job training and (6) through training books such as Pocket Guide to Installing Armstrong Floors. A few of the basic qualifications necessary for success in the floorcovering profession are as follow: (1) Skill in working with the hands; (2) Appreciation of color and design; (3) Ability to develop skill and craftsmanship (4) Preferably at least a high school education; (5) Neat appearance; (6) Pleasant business-like manner; and (7) Ability to get along with co-workers.

FUTURE EMPLOYMENT

The future is very good for flooring mechanics. In 1978 there were over 65,000 flooring mechanics in the United States. Retirement and death alone are expected to create approximately 1100 jobs annually in addition to the new openings which will be created. By these standards, the future in floorcovering is very bright. The main reason for this expected increase in openings for floorlayers is the continued increase of construction. All buildings need floors, and only a skilled flooring craftsperson can install the type of floors a modern business demands.

As in any trade, advancement depends upon personal skill and initiative. After several years of experience, a flooring mechanic can go into private business. No matter how one looks at it, the future of flooring mechanics is very bright.

In conclusion, the skilled craft of floorcovering offers the trainee or mechanic a very good lifetime occupation with clean indoor working conditions, a good salary, several different salary systems, and good working hours. Choosing this occupation as a life's work is a step in the right direction for the person who can qualify and desires a secure future with a steady job, possibilities for advancement and much personal satisfaction.

SUGGESTIONS ON THE USE OF SUPERVISED STUDY GUIDES

Study guides are designed for use in presenting related technical information (1) to groups of trade and industrial students with diversified vocational objectives, and (2) to heterogeneous groups in which the learning levels of individual students vary considerably. They are not intended to be a type of "correspondence" course, but must be used by students under the direct supervision of a related subjects teacher or teacher-coordinator.

You, as the student, can increase your learning if you follow this simple routine:

1. Begin by being sure you have the materials and references needed to complete the assignment;
2. Carefully read the introduction. It tells you what information is to be learned;
3. Study the words and the figures. They both will help you to understand the information you need to learn;
4. If you need help, ask your teacher or job sponsor for it;
5. Read carefully the assigned pages in the reference book. Do the assigned questions and exercises carefully. Treat them as an aid to learning; and,
6. Take the tests carefully. If your answers indicate that you do not know the material covered, study it again until you have gained a full understanding of the material.

UNIT 1: METHODS OF FITTING SHEET MATERIALS: FREEHAND KNIFING

MATERIALS NEEDED: Pencil, notebook paper, notebook

REFERENCES: Pocket Guide to Installing Armstrong Floors, Armstrong Cork Company, Lancaster, Pa. 17604. 91975.

INTRODUCTION: Upon completion of this lesson the student will be able to describe the procedures for freehand knifing.

ASSIGNMENT: Read pages 3-15, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. What are the three general methods of fitting sheet resilient flooring into a room? Describe the basic systems.

2. Describe the five steps in freehand knifing methods of fitting sheet material.

3. Describe the four basic safety cuts and the purposes for which each is used.

4. What four points should you keep in mind when sharpening a S-92 linoleum knife?

UNIT 1: METHODS OF FITTING SHEET MATERIALS: FREEHAND KNIFING

I. COMPLETION: Fill in the blanks.

1. The first and most helpful step in fitting by freehand knifing is to_____the pieces accurately.

2. The material is easier to unroll in the room if it is rolled face_____outside the room.

3. It is important that the linoleum knife be_____ enough and_____enough to hold a good edge.

4. The precut piece of linoleum should allow_____inches of material along each end wall.

5. _____are made so that the material will lie flat on the floor for final fitting.

II. MATCHING: In the blanks on the left, place the letter of the statement on the right that relates to the word beside the blank.

_____6.	vertical cut	A. outside corners
_____7.	diagonal cut	B. use dry
_____8.	carborundum #119	C. irregular walls
_____9.	direct scribing	D. heavy paper
____10.	pattern scribing	E. inside corners
		F. use with oil
		G. more than one piece of material

III. TRUE/FALSE: In the blanks to the left, place the word true or false.

____11. The side of the knife is allowed to ride on the wall to prevent marring when finishing the material.

____12. The final cuts are made before adhesive is applied.

____13. When strip measuring the edge, the cut should be made exactly.

____14. The knife is sharpened by pulling it into the stone.

____15. Safety cuts prevent tearing of the material.

UNIT 2: SCRIBING, DIRECT OR STRAIGHT, SCRIBING PIPE, AND DOOR TRIMS

MATERIALS NEEDED: Pencil, notebook paper, notebook

REFERENCES: Pocket Guide to Installing Armstrong Floors, Armstrong Cork Company, Lancaster, Pa. 17604, 1975.

INTRODUCTION: Upon completion of this lesson, the student will be able to:

1. Use the scribe and make direct or straight cuts.
2. Use the scribe to cut patterns for pipe and door trim.

ASSIGNMENT: Read pages 16-21, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTION:

1. Define direct or straight scribing.
2. What steps are used in straight scribing?
3. Why should the knife blade edge be beveled?
4. How can the mechanic correct the material when it has been turned or cocked?
5. Why should a line be drawn on the material and subfloor?
6. Describe how pipes are scribed.
7. How are door trims allowed for or scribed?

UNIT 2: SCRIBING, DIRECT OR STRAIGHT, SCRIBING PIPE, AND DOOR TRIMS

I. MULTIPLE CHOICE: Select the best answer. Place the letter in the blank at the left.

_____1. Direct or straight fitting is used in areas where more than _____piece(s) of material is(are) to be installed.

a. four
b. two
c. one
d. six

_____2. A divider or scribing bar is used to
a. draw circles on floor
b. move outline of wall onto material
c. scribe three sides of material
d. scribe against woodwork

_____3. When straight scribing is used, the usual procedure is to scribe_____sides of the sheet.
a. four
b. two
c. three
d. one

_____4. The knife is beveled because it
a. cuts cleaner
b. cuts closer
c. allows a smoother finish
d. stays sharper longer

_____5. To correct a turn or cock of material the mechanic should
a. match other side of material
b. draw a line along factory edge of material and place against main wall
c. match opposite line with factory edge
d. these errors cannot be corrected

II. MATCHING: List the four steps of straight scribing in proper order.

_____6. Step 1	A. move away from wall and cut with knife
_____7. Step 2	B. scribe the outline of the main wall
_____8. Step 3	C. place material with both ends flashed
_____9. Step 4	D. place pencil line on wall and material

III. TRUE/FALSE: In the blanks to the left, place the words true or false.

_____10. It is necessary that the legs of the divider or the scribing bar be held at right angles to the edge of the material.

_____11. The main wall is the one which fits the length of the material.

_____12. The main wall is always scribed last.

_____13. The line drawn on the subfloor and the material should line up when the piece is in place.

_____14. When scribing a wall and a pipe at the same time, offset lines are used for the sides of the pipe.

_____15. Offset lines are not required to cut around door trim.

UNIT 3: PATTERN SCRIBING

MATERIALS NEEDED: Felt paper, knife (straight blade),tape, dividers, straight edge, rule

REFERENCES: Pocket Guide to Installing Armstrong Floors, Armstrong Cork Company, Lancaster, Pa. 17604,1975.

INTRODUCTION: When installing floors around irregular walls and objects, some method must be used to ensure accurate fitting of the floor material.

ASSIGNMENT: Read pages 23-31, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. What is pattern scribing?
2. How is flooring material fitted around a pipe?
3. How are lines transferred from the pattern to the material?
4. What are double seam cuts and how are they made?

UNIT 3: PATTERN SCRIBING

MATCH THE NUMBERED DEFINITIONS WITH THE CORRECT WORDS GIVEN BELOW

1. Method used to secure pattern pieces together
2. One of the most important aspects of flooring installation
3. A method of fitting materials in complicated areas
4. Scribing is done with this instrument
5. Double-cut seams are generally used on this type of material
6. Recommended material for pattern making
7. Pipes can be marked on patterns by using this tool
8. Tool used to press flooring
9. Object used to lay out flooring material in complicated areas
10. Tool used to cut flooring to prevent damage

_____A. divider

_____B. rotovinyl

_____C. felt

_____D. taping

_____E. seam cutting

_____F. pattern scribing

_____G. roller

_____H. notched knife

_____I. rule

_____J. pattern

_____K. glue

_____L. hammer

UNIT 4: RECESS SCRIBE OR UNDERSCRIBE SEAM, FINISHING THE JOB, INSTALLATION TIPS

MATERIALS NEEDED: Pencil, notebook paper

REFERENCES: Pocket Guide to Installing Armstrong Floors. Armstrong Cork Company, Lancaster, Pa. 17604, 1975.

INTRODUCTION: Upon completion of the lesson, the student will be able to describe the procedure for recess scribing, underscribing, matching cuts, rolling, and clean up.

ASSIGNMENT: Read pages 32-38, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. Describe the technique of doing the recess scribe or underscribe seam.
2. Describe what must happen to the seam after it has been rolled into place.
3. Describe what should be the technique for finishing the job.
4. Discuss briefly the various means of cleaning the floor covering.

UNIT 4: RECESS SCRIBE OR UNDERSCRIBE SEAM

COMPLETION: Fill in the blanks.

1. The first piece of floor covering should have at least_____ cut off the factory edge.

2. The knife is held straight up and down, and the scrap should be on the_____for right handers.

3. All material should be rolled with a _____lb. roller.

4. For removing whitening on vinyl corlon floors,_____ can be used.

5. A good cleaner for tar on resilient floors is_____.

MATCHING: In the blanks on the left, place the letter of the statement on the right that relates to the word besides the blank.

_____6.	Recess scribe cut	A. satisfied customer
_____7.	Burr removal	B. typewriter eraser
_____8.	First impression	C. heavy materials
_____9.	Removing gloss	D. underscribe seam
____10.	Miscuts	E. knife
		F. wet steel wool
		G. seam sealing cement

TRUE/FALSE: In the blanks to the left, place the word true or false.

____11. The cutting knife should be held straight up and down when cutting heavy materials.

____12. If the scribe is set correctly, it will cause removal of 1/32" less from edge, to ensure a tight fit.

____13. Burrs and rough edges must be removed before the seam is rolled.

____14. Number 180 wet or dry sandpaper is ideal to remove rough edges.

____15. Traffic will usually remove the gloss on floor coverings.

UNIT 5: INSTALLATION TIPS ON PATTERN MATCHING SHEET VINYL FLOORS

MATERIALS NEEDED: Blackboard, chalk, visual aids

REFERENCES: Pocket Guide to Installing Armstrong Floors, Armstrong Cork Co., Lancaster, Pa. 17604, 1975.

INTRODUCTION: The purpose of this unit is to review some of the basic causes of pattern mismatching and to list steps that can be taken to minimize mismatch problems.

ASSIGNMENT: Read pages 39-44 in Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. What are two factors which affect pattern matching?
2. Explain "stretching of the wear layer."
3. When should material be cut for a specific job? In what sequence should cut pieces be used?
4. What is the difference between "measured and stretched" pattern repeats?
5. How do you compensate for seams on an existing floor when installing resilient flooring material?

TRUE/FALSE: In the blanks to the left, place the word true or false.

_____ 1. Products are packaged and shipped in sheet form.

_____ 2. Material for a specific job should not be cut until the day of the job.

_____ 3. Separate pieces should be rolled face-out to the same diameter roll.

_____ 4. Material being cut from the roll should be marked and numbered as it is cut.

_____ 5. Unroll all pieces at the job site so that they are flat for the same amount of time before installing.

_____ 6. Short seams provide more problems in pattern matching.

_____ 7. Armstrong recommends the use of particle board type underlayments as subfloor.

_____ 8. The smaller the core diameter, the greater the stress.

COMPLETION: Fill in the blanks.

9. After cutting material from the roll and numbering each cut, the separate pieces for a particular job should be laid out in _____.

10. Any necessary preshrinking to overcome a minor mismatch can be accomplished by rolling the pieces _____.

11. When using pieces from separate rolls you must first lay them side by side for examination to determine the closeness of _____ and for _____ match.

12. Cutting patterned material to exact measured pattern repeats without regard for actual _____ repeats can result in pieces too short for matching.

13. Shading of sheet material is designated by a (an) _____.

14. Never install resilient flooring material so that the seams fall directly over the _____.

UNIT 6: ESTIMATING PATTERNED SHEET MATERIALS

MATERIALS NEEDED: Pencil, note paper, calculator (helpful but not necessary)

REFERENCES: Pocket Guide to Installing Armstrong Floors. Armstrong Cork Company, Lancaster, Pa. 17604, 1975.

INTRODUCITON: Upon completion of this lesson, the student will be able to estimate the length of floor coverings in order to match designs in a room of any given length.

ASSIGNMENT: Read pages 45-48, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP

1. How long should the first length of material be measured for a room 11'-6" in length with an 18 inch match?

2. How long must the next length of material be measured in question number one if the design repeats itself every 27 inches?

3. If the design repeats itself every nine inches, how long must all lengths of the material (after the first) be measured, if the length of the room is 12'9"?

4. If the design repeated itself every 4 1/2 inches, how long should the second length be, if the room is 10'9"?

5. If the room to be fitted is 14'x11' and the material is 6 feet wide with a design repeat every 18 inches, what is the total amount of material that must be cut from the supply?

UNIT 6: ESTIMATING PATTERNED SHEET MATERIALS

IN EACH OF THE FOLLOWING PROBLEMS, DETERMINE THE CORRECT LENGTH OF THE MATERIAL IN ORDER TO MATCH DESIGN

Number	Length of Room	Repeats	Length of Material (after first length has been cut)
1.	12 feet	18 inches	_____
2.	13 feet, 2 inches	15 inches	_____
3.	11 feet, 6 inches	9 inches	_____
4.	14 feet	27 inches	_____
5.	12 feet, 3 inches	14 inches	_____
6.	15 feet, 7 inches	18 inches	_____
7.	17 feet, 5 inches	54 inches	_____
8.	16 feet	13 1/2 inches	_____
9.	10 feet, 9 inches	14 inches	_____
10.	13 feet, 1 inch	9 inches	_____
11.	10 feet, 2 inches	27 inches	_____
12.	15 feet	54 inches	_____
13.	16 feet, 3 inches	15 inches	_____
14.	17 feet	18 inches	_____
15.	14 feet, 4 inches	4 1/2 inches	_____

UNIT 7: INSTALLATION PROCEDURES

MATERIALS NEEDED: Paper, pencil, notebook

REFERENCES: Pocket Guide to Installing Armstrong Floors. Armstrong Cork Company, Lancaster, Pa. 17604 (1975).

INTRODUCTION: Upon completion of this lesson the student will be able to describe installation of Permiflor, Permiflor Plus, Tile-On Systems and application of adhesives.

ASSIGNMENT: Read pages 49-56, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. What are the three types of installation systems?
2. What are the differences between S-200 and S-205 adhesives?
3. How can adhesive smearings on floor coverings be removed during application?
4. What is the purpose of rolling newly installed floor coverings?
5. What are three precautions to take when installing Tile-On systems?

UNIT 7: INSTALLATION PROCEDURES

TRUE/FALSE: In the blanks to the left, place the words true or false.

_____1. Permiflor may be installed over concrete.

_____2. Permiflor installation is not recommended over asphalt or vinyl-asbestos tile.

_____3. S-200 Permiflor cement is pre-mixed.

_____4. If one spreads S-205 cement in a thin film, one could wait up to three hours before installing floor covering.

_____5. The spreading capacity of the large unit size of S-200 Permiflor cement is 160 lineal feet.

_____6. In installing Permiflor Plus Systems, care must be taken that seams do not fall within 6 inches of the seams of the original floor.

_____7. One should not install Tile-On System over vinyl-asbestos tile.

_____8. Both S-200 and S-205 cement may be stored in cold places.

_____9. A Tile-On System may show indentations if heavy objects, such as chairs, are placed on it without coasters.

____10. Wax need not be removed from the original floor when installing Permiflor Plus or Tile-On Systems.

COMPLETION: Fill in the blanks.

1. A _____inch wide band of S-200 or S-205 cement should be applied around seams of Permiflor and Permiflor Plus Systems.

2. One should fill or level any_____or_____before applying cement.

UNIT 8: HOW TO TEST FOR MOISTURE: UNDERLAYMENTS

MATERIALS NEEDED: Pencil, notebook paper, notebook

REFERENCES: Pocket Guide to Installing Armstrong Floors. Copyright 1975. Armstrong Cork Company, Lancaster, Pa. 17604, 1975 .

INTRODUCTION: Upon completion of this lesson, the student will be able to make a moisture test and describe different types of underlayments used for subfloors.

ASSIGNMENT: Read pages 57-64, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTION:

1. What is the purpose of a moisture test on subfloors?
2. Describe the two methods of testing for moisture.
3. What are the two main types of subfloors found in construction?
4. What are the two main types of underlayments used on subfloors?

UNIT 8: HOW TO TEST FOR MOISTURE: UNDERLAYMENTS

COMPLETION: Fill in the blanks.

1. The best type of moisture test for concrete is the _____ test.

2. All types of subfloors can be tested for moisture with the _____ test.

3. The two main types of underlayment are _____ and _____.

MATCHING: In the blank on the left, place the correct letter of the statement in column B that matches the word.

Column A	Column B
_____ 4. Hardboard	A. used to check moisture content of most types of subfloors
_____ 5. Plywood	B. type of underlayment used in remodeling work
_____ 6. Particle board	D. generally used to level concrete subfloors
_____ 7. Mastic underlayment	E. type of underlayment used in most new construction
_____ 8. Latex underlayment	F. can be used as an underlayment under all types of resilient floors
_____ 9. Primer test	G. type of underlayment recently introduced into new construction
_____10. Mat bonding test	

TRUE/FALSE: In the blank to the left, place the words true or false.

_____11. It is safe to assume that a new concrete subfloor is dry after five days.

_____12. Most moisture tests can be done in two hours total time.

_____13. It is important that the proper type of underlayment be used when installing resilient floors.

_____14. For a satisfactory union with any type of mastic underlayment, it is important that the subfloor be free of paint, oil, and varnish.

UNIT 9: ADHESIVE RECOMMENDATIONS FOR INSTALLING RESILIENT FLOORS

MATERIALS NEEDED: Pencil, notebook paper, notebook

REFERENCES: Pocket Guide to Installing Armstrong Floors. Armstrong Cork Company, Lancaster, Pa. 17604, 1975.

INTRODUCTION: Upon completion of this lesson the student will be able to name the correct adhesive to use in installing resilient floors.

ASSIGNMENT: Read pages 765-71. Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. Define and sketch a suspended subfloor location.
2. Define and sketch an on-grade subfloor location.
3. Define and sketch a below-grade subfloor location.
4. Choose five types of tile. Match each with the proper adhesive for (1) Deluxe Temboard and plywood (2) Double strip wood (suspended) and (3) concrete (suspended).

UNIT 9: ADHESIVE RECOMMENDATIONS FOR INSTALLING RESILIENT FLOORS

COMPLETION: Fill in the blanks.

1. Armstrong resilient floors should never be installed over any type _____ subfloor on or below grade or where excessive alkali conditions, moisture, or hydrostatic pressure is present.

2. Where two or more adhesives are recommended, the _____ listed is the preferred choice.

3. In using the Tile-On system of installation you may install tile over any smooth existing resilient floors except _____ and _____.

4. Dusty and porous concrete floors should be primed with _____ primer before installing Excelon Tile.

MATCHING: In the blank on the left, place the correct letter of the statement in column B that matches the word in column A.

Column A		Column B
_____ 5.	Below ground level in contact with ground	A. S-611
_____ 6.	With a minimum of 18 inches of well-ventilated space below	B. S-210
		C. on grade
_____ 7.	At ground level in contact with ground	D. S-700
_____ 8.	Adhesive used to put Excelon Tile on double strip wood, suspended	E. below grade
_____ 9.	Adhesive used to put Tredway Tile on concrete, suspended	F. suspended
		G. minimal
_____10.	Adhesive used to put Solariam Tile on Ceramic Tile	H. S-80
_____11.	Adhesive used to put Fancy Free Tile on double strip wood, suspended	I. S-235

TRUE/FALSE: In the blank to the left, place the word true or false.

_____12. Vinyl cove base should be installed with either S-235 or S-700.

_____13. Seams in sheet goods should always run across the floorboard joints.

_____14. Where Excelon Tile (1/8" x 3/32") is installed direct to plywood or hardboard with S-160, S-89, or S-90, it is necessary to use S-80 Primer.

_____15. Resilient tiles should always be installed parallel over strip wood floors.

UNIT 10: ADHESIVES

MATERIALS NEEDED: Pencil, notebook, paper, notebook

REFERENCES: Pocket Guide to Installing Armstrong Floors, Armstrong Cork Company, Lancaster, Pa. 17604, 1975.

INTRODUCTION: Upon completion of this lesson, the student will be able to describe the various uses of various Armstrong adhesives.

ASSIGNMENT: Read pages 72-83, Pocket Guide to Installing Armstrong Floors. Answer the following questions.

CHECK-UP QUESTIONS:

1. Describe the method used to estimate adhesive requirements for a particular installation.
2. Name and describe the use of cements for the Permiflor installation systems.
3. What is S-80 Asphalt Primer used for?
4. Name and describe the uses of five other Excelon Tile cements.

INSTRUCTORS KEY

FOR

STUDY GUIDE FOR

FLOORCOVERING

Virginia Polytechnic Institute and State University

and

Virginia State Department of Education

INSTRUCTOR'S KEY FOR UNIT 1

UNIT 1

CHECK-UP QUESTIONS:

1. Freehand knifing, direct scribing and pattern scribing

   Freehand knifing is a method of fitting in which an oversized piece of material is taken into the room and fit while it is in place. This is the oldest type of fitting and is learned mostly by experience. There are safety cuts, to keep the material from tearing, that will be shown later.
   Direct or straight scribing is a method of fitting, generally used where more than one piece of material is to be installed. The material is moved close to the wall to be fit, and using a bar scriber or dividers, the outline of the object is scribed directly on the material.
   When pattern scribing, a pattern of felt or heavy paper is first cut into the room. Then, using dividers, a square straightedge, or other tools, all the lines of the objects are moved a certain distance onto the pattern. The material is then layed out in another area and the pattern placed over it. Using the same tools and settings as used previously, the lines of the room are moved back onto the material.

2. A. Precut pieces accurately.

   B. Move material into the room.

   C. Make safety cuts into the material.

   D. Make door trims.

   E. Final fitting

3. A. <u>Curves or irregular wall</u>

   The cut for the wall that is irregular is a vertical cut in the part of the material that flashes up the wall. These cuts allow the the material to be pushed down to the juncture of the wall and floor and take the shape of the wall.

   B. <u>Inside corners</u>

   The inside-corner safety cut is a diagonal cut across the material that allows it to be pushed down into the corner. This should be done in steps, checking the fit after each cut. This will prevent cutting too much from the corner.

C. Outside corner

The outside-corner safety cut is started by pushing the material down to the juncture of the floor and the wall. Now cut down along the corner to the floor. The material must now be trimmed flat to the floor at the corner before the ends are pushed down. If this is not done, a tear may occur at the corner.

D. Cutting completely around three sides of an object

The safety cuts for cutting completely around or on three sides of an object are these: with the material flashed up the front of the object and pushed in against the juncture of the floor and object, slit the material almost to the floor. A small crosscut can be used at the bottom of this cut to keep it from tearing out into the floor. Now work the material down to the floor by relieving any strain at pressure points by cutting the material flat to the floor at every place where pressure occurs.

4. A. Sharpen completely around the radius of the blade. This keeps the same shape to the blade and does not wear off the point.

B. Keep the angle of the blade to the stone the same on both sides. This will keep the bevels the same on both sides.

C. Try to use a smooth motion as you sharpen.

D. When the point is broken off the knife, it is sometimes easier to use a three-cornered file to get the shape back to the knife and a stone to put an edge on it.

INSTRUCTOR'S KEY

UNIT 1

COMPLETION

1. precut
2. in
3. rigid hard
4. 1 1/2
5. Safety cuts

II. MATCHING

6. C
7. E
8. B
9. G
10. D

TRUE/FALSE

11. true
12. false
13. false
14. true
15. true

INSTRUCTOR'S KEY

UNIT 2

CHECK-UP QUESTIONS:

1. Direct or Straight Scribing is the type of fitting used in areas where more than one piece of material is to be installed. When straight scribing is used, the usual procedure is to scribe three sides of the sheet. This is accomplished by sliding the piece back and forth till it lies flat.

2. A. Place material in room with both ends flashed up the wall and the length of piece close to wall.

   B. Place pencil line on wall and line up after cutting.

   C. Scribe outline of main wall onto material.

   D. Move material away from wall and cut with notched knife.

   E. Move piece in place against main wall with ends flashed up the wall.

   F. Scribe end walls by pulling piece back so it lays flat on floor.

   G. Draw a line along factory edge of material (after in place, along main wall). This is done to correct problems caused by cocked material.

   H. Draw second line on material and on subfloor at factory edge.

   I. Pull material away from end wall until it lies flat.

   J. Set dividers to the difference between the two cross lines. This is the amount that should be scribed from the end wall.

   K. Reverse procedure for other end.

3. The knife will cut cleaner if the blade is beveled to one side.

4. The remedy for this situation is to draw a line along the factory edge of the material after it is in place against the main wall. If the factory edge is kept on this line when it is pulled back from the end walls, the piece will always be straight in the room.

5. These two lines should line up when the piece is in place.

6. Offset lines should be extended straight out from the sides of the pipe and squared to the wall. Use the same scribe setting as the one for the wall, and mark the front of the pipe between the offset lines. Swing a circle with the dividers, touching both offset lines and the scribe mark. Cut a seam into the circle, and cut out the scribe line for the wall and the circle for the pipe.

7. Offset lines are also drawn on the material when scribing door trims. A rough scribe can also be used in this instance where the scribe is too long to be accurate. After the rough scribe with the scribing bar, the material can be moved closer and rescribed, using the dividers for a more accurate fit.

INSTRUCTOR'S KEY

UNIT 2

MULTIPLE CHOICE

1. C
2. B
3. C
4. A
5. B

MATCHING

6. C
7. D
8. A
9. B

TRUE/FALSE

10. true
11. true
12. false
13. true
14. true
15. false

INSTRUCTOR'S KEY

UNIT 3

CHECK-UP QUESTIONS

1. Pattern scribing is a method of fitting material in small complicated areas. Using a pattern made of lining felt or some other paper, the lines of the objects in the room are moved onto the pattern, and when this pattern is placed over the material to be installed, the lines are moved back the same distance.

2. Pipes can be marked by using a rule to move the sides of the pipe onto the pattern. When this is done, on four sides of the pipe there will be a square on the pattern. When the pattern is placed over the material and these lines moved back the width of the rule, there will be a square on the material that the pipe will fit into. Using a divider, swing a circle, hitting all four sides of the square, and the pipe will fit in the circle.

3. The felt pattern must be placed over the material so that it is laying exactly as it was in the room. The cross lines you put across the seams will help you to line up the pieces of the pattern. The pattern must be fastened to the material in a manner so that it will not move. Small triangular windows will help one in the use of tape to fix the pattern to the material. Extend all the lines on the pattern back onto the material the same distance they were extended on to the pattern. It is necessary that one use the same tools and setting to transcribe onto the material that was used to scribe on the felt pattern. To insure this, put the setting of the dividers on the pattern before scribing,, and this setting can be checked before the pattern is transcribed.

4. Double-cut seams are generally used on the rotovinyl-type materials. These are materials that can be cut through two thicknesses in one cut.
   A. Install first piece and bring second piece into room.
   B. Spread adhesive under the half along the wall.
   C. Overlap the second piece over the first piece at the factory edge.
   D. Check that overlap is correct so pattern will match.
   E. Cement outside of second piece.
   F. Place a scrap piece under the seam area.
   G. Using straightedge, cut through both pieces in one cut

INSTRUCTOR'S KEY

UNIT 3

MATCHING

1. D
2. E
3. F
4. A
5. B
6. C
7. I
8. G
9. J
10. H

INSTRUCTOR'S KEY

UNIT 4

CHECK-UP QUESTIONS:

1. This type seam cutting is recommended for the heavier type materials that are not easy to cut through in one cut.
   A. After first piece is fit in room, fit second piece with proper overlap.
   B. Cut at least 1/4" off from factory edge of first piece.
   C. With proper overlap, insert recess scriber so knob on bottom will follow straight edged piece. Pin should mark the top piece.
   D. Insert a scrap piece under scribe mark, face down.
   E. Cut seam with straight knife.
   F. Roll seam into place with a hand roller.
   G. Skive off burr with back of linoleum knife (or remove with #320 sandpaper).

2. After the seam is rolled into place with the hand roller, the burr or rough edge must be removed. This burr comes from the recess scriber when the seam is scribed. There are a number of different ways to remove this burr. After the piece is in place, the back of the linoleum knife can be used to skive off the burr. Wet steel wool or 320 sandpaper can also be used to remove the burr.

3. A. Roll with 100 lb. roller.
   B. Clean floor of all scrap materials, paste spots and trademarks.

4. Removing Gloss from Sealed Rotovinyl Seams
   A typewriter eraser can be used to remove the gloss from seams sealed with S-553 adhesive. This, of course, should not be done till the adhesive has dried. Traffic will usually remove this gloss, but if a customer persists, it can be removed in this manner.

   Removing Whitening on Vinyl Corlon Floors
   Wax shoe polish, of an appropriate color, can be used to remove the whitening that occurs on some of the darker patterns in Corlon when the seam is recess scribed. Use a small amount on the tip of your finger covered with a cloth, and buff off excess with a dry cloth.

   Filling Miscuts
   S-553 Seam Sealing Cement is useful to make a paste to fill miscuts on Vinyl Corlon. Pour a little on a scrap piece of material, and soon it will soften till you can scrape off a paste to be used to fill miscuts. As with anything of this sort, if you have never tried it, practice first on a scrap piece of material.

   Removing Small Amounts of Tar from Flooring
   Waterless hand cleaner is very useful for removing tar from resilient floors. Since it does contain some solvent, it will soften the asphalt, but it is gentle enough not to harm the floor.

INSTRUCTOR'S KEY
UNIT 4

I. COMPLETION

1. 1/4 inch
2. right hand
3. 100
4. wax shoe polish
5. waterless hand cleaner

II. MATCHING

6. C
7. F
8. A
9. B
10. G

III. TRUE / FALSE

11. true
12. false
13. false
14. false
15. true

INSTRUCTOR'S KEY

UNIT 5

CHECK-UP QUESTIONS

1. Stretching of wear layer and composition.

2. The packaging of products in roll form results in stretching of the wear layer and the patterns on it, and this is caused by the bending of the material in the process of making rolls. The stress or stretching caused by bending the material during the roll-up will vary, depending on how tightly the material is rolled and the location of individual laps within each roll. The bending stress is four times greater on the lap around a 3" core and two times greater on the lap around a 7" core than it is on the outer lap of a roll that is 12" in diameter.

3. Material for a specific job should be cut from the roll on the day before the material is to be installed. As material for a specific job is being cut from the roll, the individual cuts should be marked and numbered as they are cut from the roll; i.e., first cut from roll #1; second cut--#2; etc. Because of the difference in original location within the roll of each of these pieces, each has been subjected to different bending stresses and will show some differences in stretching of the wear layer.

4. If materials are checked for match before cutting for job length, errors can be eliminated and installation problems, avoided. For example, cutting patterned material to exact measured pattern repeats without regard for actual stretched repeats can result in pieces cut too short for matching. Job-length cuts should always be made on the basis of the length of actual repeats in the material that will be installed, rather than on the basis of factory-designated repeat length.

5. A. Be alert to employ short seams in preference to long seams.

   B. A check of pattern match should be made on pieces to be seamed, when using more than one full roll of material for an installation or when pieces from separate rolls are to be employed on one job. Pieces from separate rolls should be given a side-by-side examination to determine the closeness of shade match and pattern match as well.

INSTRUCTOR'S KEY

UNITE 5

I. TRUE/FALSE

1. false
2. false
3. true
4. true
5. true
6. false
7. false
8. true

II. COMPLETION

9. correct numerical sequence
10. face in
11. shade, pattern
12. stretched
13. shade letter
14. old seams, existing floor

INSTRUCTOR'S KEY

UNIT 6

CHECK-UP QUESTIONS

1. 11'9" (11'6" + 3" for trimming)

2. 13'6" (next 18" match after 12'-9")

3. 13'6" (next 9" match after 12'-9")

4. 11'-3" (next 4 1/2" match after 10'-9", allowing at least 3" for trimming & fitting)

5. 1st piece: 14'-3"
   2nd piece: 15'-0"

   Total footage 29'-3"

INSTRUCTOR'S KEY

UNIT 6

1. 13 feet, 6 inches
2. 13 feet, 9 inches
3. 12 feet
4. 15 feet, 9 inches
5. 13 feet, 4 inches
6. 16 feet, 6 inches
7. 18 feet
8. 16 feet, 10 1/2 inches
9. 11 feet, 8 inches
10. 13 feet, 6 inches
11. 11 feet, 3 inches
12. 18 feet
13. 17 feet, 6 inches
14. 18 feet
15. 14 feet, 7 1/2 inches

INSTRUCTOR'S KEY

UNIT 7

CHECK-UP QUESTIONS

1. Permiflor, Permifloor-Plus and Tile-On Installation Systems

2. S-200 cement should be used over polyurethane-type seamless flooring. This cement is a two-part adhesive which requires mixing.
   S-205 cement is a one-component adhesive which can be applied just as it comes from the container. It is used with Vinyl-Corlon materials.

3. Use a cloth dampened with water to remove S-200 cement. Use denatured alcohol for removing S-205 adhesive.

4. Rolling with a 100 lb. roller in both directions is necessary in order to remove trapped air. Always roll out from center.

5. Precautions:

   Do not install over installations which have a history of excessive moisture or alkaline salts.
   There may be slightly less resistance to indentation.
   Some subfloor irregularities may show through the finished Excelon Tile floor.
   Maintain a minimum room temperature of 70 F.

INSTRUCTOR'S KEY

UNIT 7

TRUE/FALSE

1. true
2. true
3. false
4. false
5. true
6. true
7. true
8. true
9. true
10. false

COMPLETION

1. 4
2. joints or holes

INSTRUCTOR'S KEY

UNIT 8

CHECK-UP QUESTIONS

1. New concrete may look dry but tests are necessary to assess if the base is cured enough to make a good bond. Testing is especially needed for ground level sub-floors.

2. Primer Test: Use the primer test before applying Excelon Vinyl Asbestos Tile.
   Brush S-80 Primer over several areas 3' x 3'. If after 24 hours, the primer can be scraped or peeled from the subfloor, the subfloor is unsuitable for installation of tile. In this event, the subfloor should be allowed to dry further, or further steps should be taken to remove the residue of paint, oil, or curing compounds. Then tests should be repeated until the primer becomes well bonded to the surface, whereupon installation can proceed.

   Mat Bonding Test: This test is used on any subfloors where moisture is suspected, or where paint, oil, concrete, hardeners or curing compounds have been removed.
   Squares of the material (approximately two feet square) are bonded to the subfloor with the same adhesive to be used for installation. If, after 72 hours, the material is firmly bonded to the sub-floor, it can be reasonably assumed that the installed floor will also bond. Test near the outside walls or columns.

3. A. Concrete, ceramic tile, terrazzo, steel and wood

   B. Underlayment

4. Hardboard and plywood

INSTRUCTOR'S KEY

UNIT 8

COMPLETION

1. primer

2. mat bonding

3.A. concrete B. wood

MATCHING

4. B

5. E

6. G

7. C

8. F

9. D

10. A

TRUE/FALSE

11. false

12. false

13. true

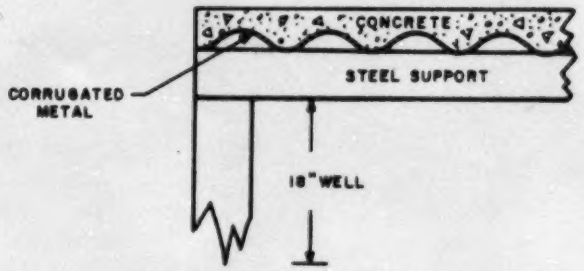
14. true

INSTRUCTOR'S KEY

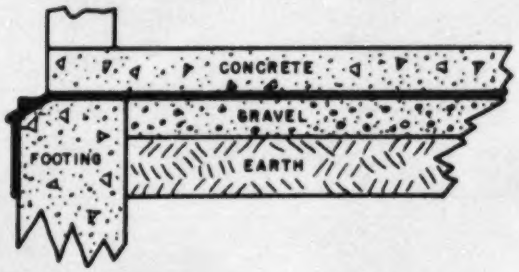
UNIT 9

CHECK-UP QUESTIONS

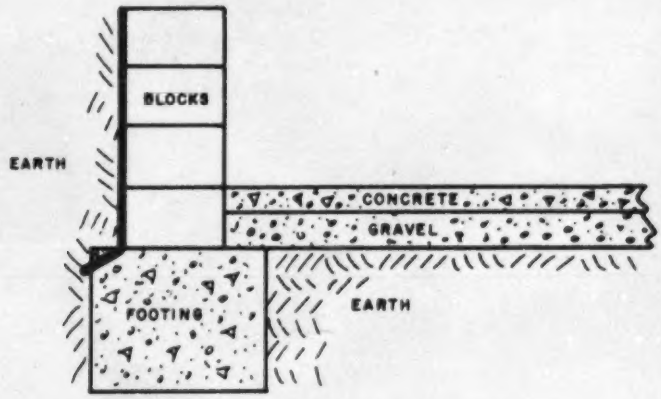
1. Suspended subfloor - with a minimum of 18 inches of well ventilated air space below.



2. On - grade subfloor - at ground level in direct contact with ground or above ground level, with fill that is in direct contact with ground.



3. Below - grade: partically or completely below the surrounding ground level in direct contact either with the ground or with fill that is in direct contact with the ground.



4. See chart on pages 70 - 71.

INSTRUCTOR'S KEY

UNIT 9

I. FILL IN THE BLANKS

1. wood-constructed

2. first

3. cushion-backed vinyl, cushioned rotovinyl

4. S-80

II. MATCHING

5. E

6. F

7. C

8. D

9. A

10. I

11. B

III. TRUE/FALSE

12. false

13. true

14. true

15. false

INSTRUCTOR'S KEY

UNIT 10

CHECK-UP QUESTIONS

1. Total the number of square feet of floor area to be covered, and divide by the average covering capacity per gallon of the adhesive being used. The answer will be the number of gallons required.

2. The two parts of this adhesive are mixed on the job and spread with a standard notched spreader within 30 minutes after mixing. Adhesive is spread only at the perimeter and seams of the material. Sensitive skin may be affected by solution. Remove with soapy steel wool pad or clean cloth dampened in water.

   TYPE: Two-part
   COLOR: Amber
   SPREAD 4" WIDE: Small -- 35 lin. ft.
   Medium -- 75 lin. ft.
   Large -- 160 lin. ft.
   CONTAINERS: Small, Medium, Large

3. S-80 Asphalt Primer is used for priming dusty, porous subfloors for Excelon Tile installation.

   Use directly on concrete subfloors, suspended, on, or below grade. Also a primer for plywood, hardboard, or steel subfloors. Apply with brush, trowel, or rubber squeegee. Let dry 24 hours or until dry enough to walk upon. Remove with fine steel wool, cleanser, and water. Inflammable.

4. S-90 CEMENT
   For excelon over primed or unprimed subfloors

   S-89 CEMENT
   For excelon tile (longer open time)

   All the same uses and advantages of S-90 Cement with the added advantage of an 18-hour open time. Ideal for large contract jobs.

   S-750 CEMENT
   For installing light-colored excelon tile

   S-139 TILE-ON CEMENT
   For installing excelon tile over existing resilient floors

   S-160 EMULSION
   For installing excelon tile over lining felt

INSTRUCTOR'S KEY

UNIT 10

COMPLETION

1. S-235 cement
2. S-80 asphalt
3. S-75 cement
4. S-700 cement
5. clean, dry

MATCHING

6. B
7. C
8. D
9. E
10. A

TRUE/FALSE

11. false
12. true
13. false
14. true
15. true